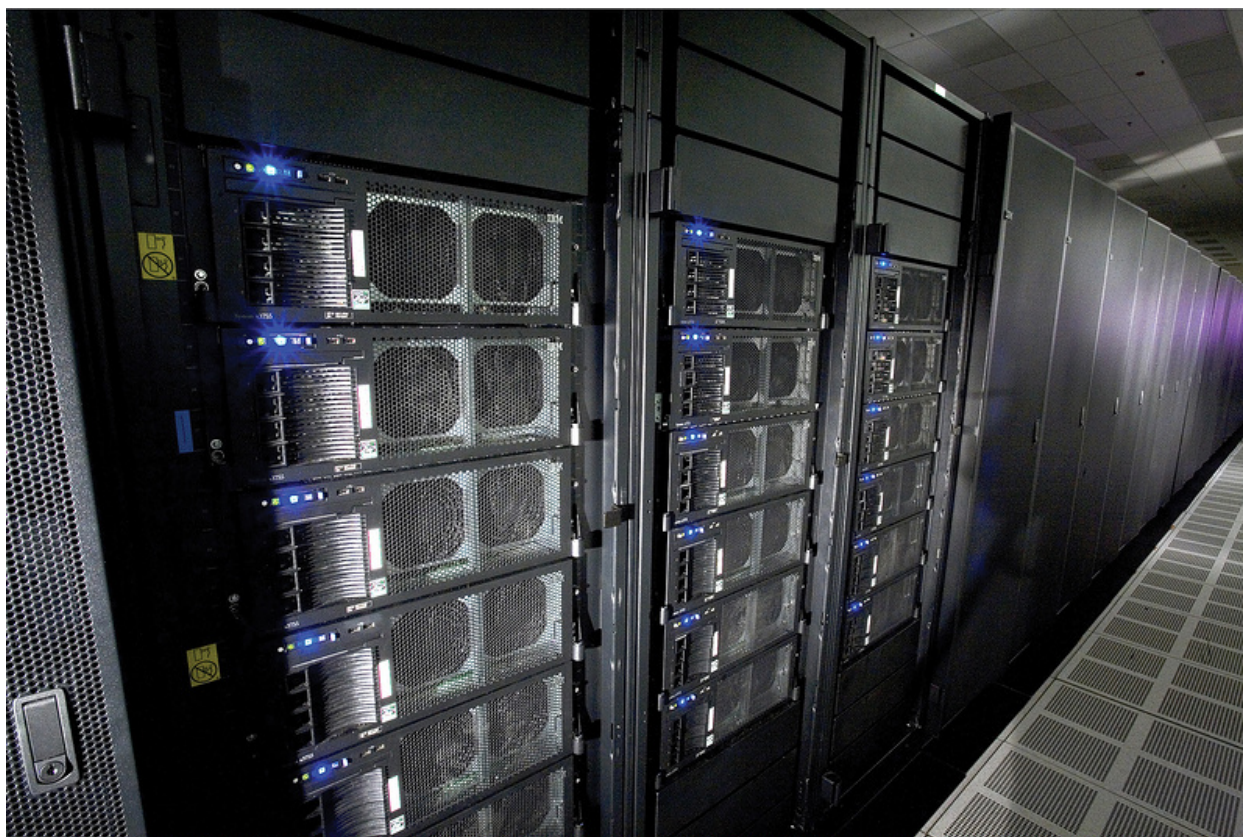# Supercomputer decommissioning

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While the story of the decommissioning of the Lab's record-breaking supercomputer garnered media attention around the world, less attention was given to the process of actually taking the machine out of service; it represents a significant amount of hardware that must be removed and properly destroyed. Because the machine performed classified work, a security plan stipulates the steps necessary to ensure that any information it once stored is completely destroyed—along with the majority of the hardware (but more on this later).

The scope of decommissioningRoadrunner was the first computer in the world to reach a petaflop (or the ability to do one quadrillion floating point operations per second) and was used to help ensure the safety and reliability of the nation's nuclear stockpile. This work required lots of processors with the computer made up 278 racks of equipment weighing approximately 1,200 pounds each. That's more than 330,000 pounds of metal, cables and plastic that was no longer needed. While small amounts of precious metals could be reclaimed, there was still a lot of material that needed to be treated carefully. The current regulatory disposal method of choice: the machines are physically shredded ensuring that any information they ever contained would no longer be accessible—ever.

The entire process is overseen by Lab personnel (each shredding session lasts about two and a half days) and must be certified when destruction is complete. From there, the resulting "mulch" is recycled with the Lab receiving 40 cents per pound.

The future of classified decommissioning? Theoretically, computers used for classified work could be sanitized of potentially critical information by removing their memory and repurposing the rest of the equipment. However, such donations are not currently allowed for any supercomputers that processed classified information due to security concerns. However, efforts are underway to determine if such donations might be done in the future without compromising national security.

Filling Roadrunner's computational shoesWhile Roadrunner was probably the best known of the Los Alamos supercomputers, in reality, the Lab has 10 supercomputers, or "high performance computing clusters" in geek speak, operating in both unclassified and classified environments. With names like Cielo, Lobo, Mustang and Moonlight, the work performed by Roadrunner has been shifted to other machines.

Because it takes so long to get these systems up and running, Stockpile Stewardship classified computing is leveraged across multiple DOE computing sites. The next slated cutting-edge machine is Sequoia at Lawrence Livermore National Laboratory in California. It was just transitioned into the classified environment there in April (https://asc.llnl.gov/computing_resources/sequoia/).

For Los Alamos, deliveries of its next high-performance system is expected to begin in 2015. It's name: Trinity.

After operating for five years, Roadrunner was old by any computing standards but it performed its job well and, at the time it was installed, represented a leap of faith for a new, hybrid computer system that used two different types of processors.

With each new generation, the computer systems become faster, more energy efficient and less expensive to operate.

The world of supercomputing is now chasing the exaflop, or a billion billion operations per second…